

# City of Janesville Performance Contract Savings Report



Year 1 M&V Report



# Overview

City of Janesville (COJ) and Johnson Controls, Inc. (JCI) entered into the Performance Contract (PC) for the Municipal Building on April 14, 2011.

The following is a financial summary of the agreement:

- **\$275,291 Investment**
- **Projected Savings: \$63,867 (3 years)**
- **Construction Period Savings: \$3,106**

Completion and commissioning of individual Scope items have been documented allowing COJ to capture savings during the Installation Period (since June 2011 when the lighting retrofit was completed).

The report summarizes the Year 1 performance period which spans November 1, 2011 to October 31, 2012.

# Scope Items

The Energy Conservation Measures (ECMs) implemented during the project include:

**Chiller Replacement:** The new high efficiency York chiller provides the same amount of cooling at a lower energy cost versus the old chiller.

**Lighting Upgrades:** This measure reduces the overall lighting energy requirement of the buildings due to higher-efficiency lighting systems that use lower wattage lamps and occupancy sensors for better lighting control.

**Variable Frequency Drives (VFDs):** VFDs allow each pump or fan to vary their speed based on existing demand.

**Metasys Building Controls Upgrade:** Existing pneumatic controls were converted to Direct Digital Controls (DDC). This strategy adds the ability to apply better equipment scheduling and other optimization strategies.

**Re-Commission of Existing Control System:** The Recommissioning process investigated existing sequence of operations.

**Replacement of Heating and Chiller Water Coils:** One (1) Hot Water Coil and five (5) chilled water coils were replaced.



# Chiller Replacement

- One (1) new York YLAA-091HE46XCA high efficiency air-cooled scroll compressor chiller was installed.
- The new chiller uses 1.017 kW of power to provide one (1) ton of cooling, while the old chiller used 1.51 kW. This represents an outstanding increase in efficiency.
- In addition to a more energy efficient operation, the York chiller offers improved reliability and quality.

# Lighting Upgrade

- T12 fixtures with magnetic ballast were replaced with higher efficiency T8 bulbs with electronic ballasts.
- Incandescent luminaires were replaced with Compact Fluorescents (CFLs).
- Occupancy Sensors were installed to control the lighting based on motion.
- The new fixtures greatly increased the lighting quality of its immediate environment at a lower cost per lumen.

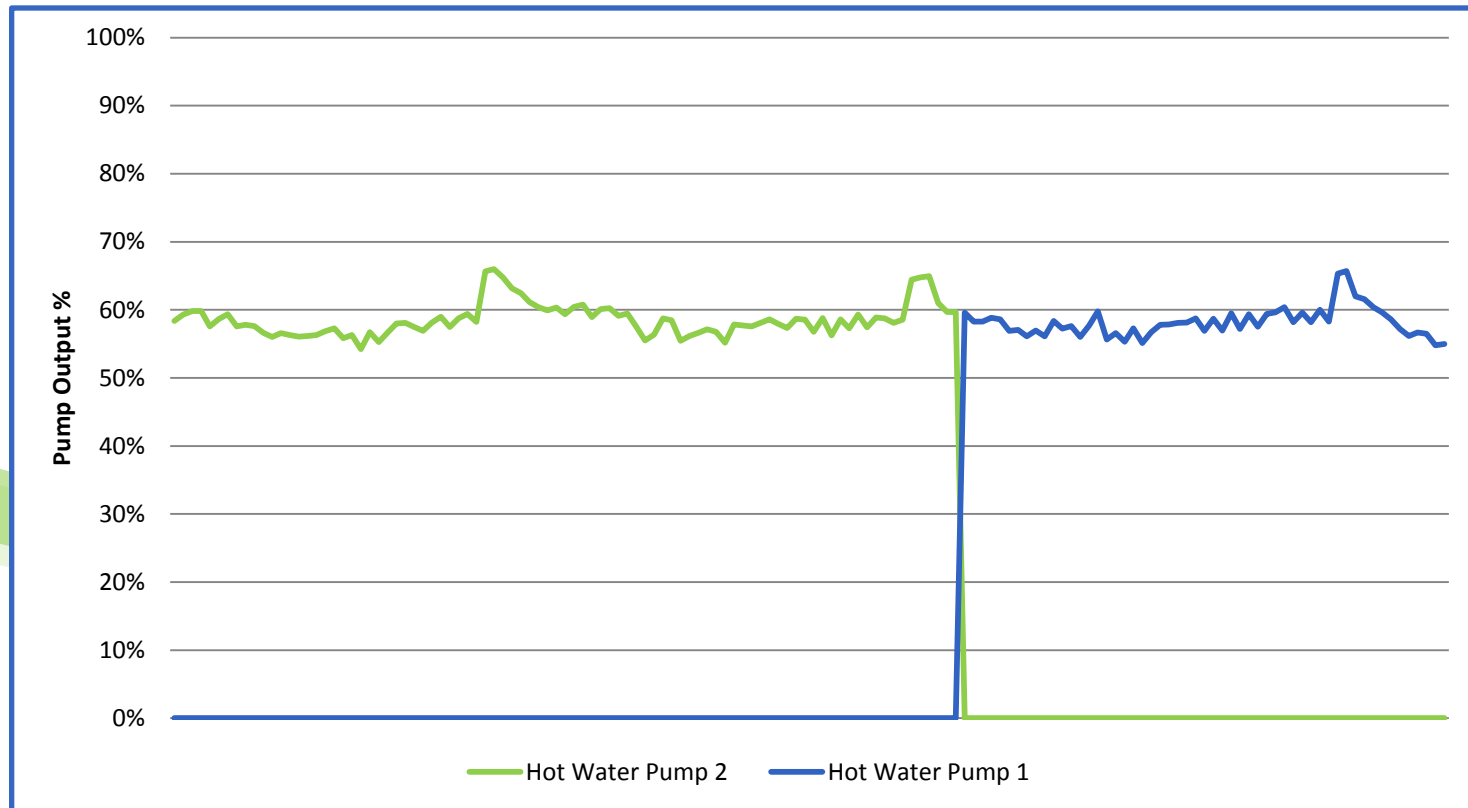


# Variable Frequency Drives

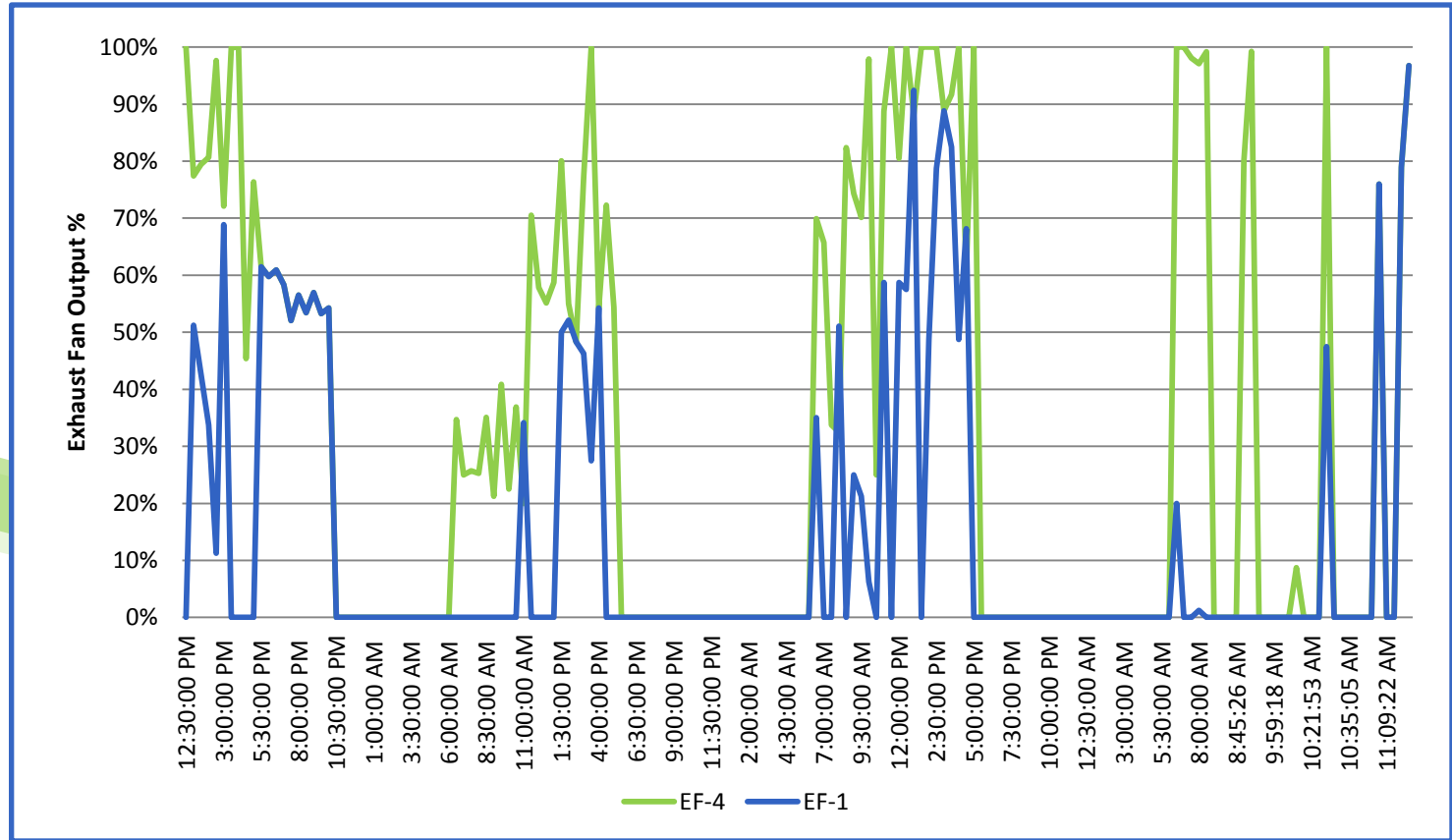
- VFDs were installed on two (2) existing five (5) HP hot water pumps to vary speed based on the instantaneous heating load. This ECM not only saves energy but also improves occupant comfort by reducing temperature variations that are experienced in a traditional “start/stop” pumping system.
- VFDs were also installed on two (2) exhaust fans to remove air based on occupancy and environmental conditions.
- Reduction in motor speed reduced the mechanical stress in the motor and its associated components, which improves overall reliability.



# Variable Frequency Drives Hot Water Pumps – 3 Day Period



# Variable Frequency Drives Exhaust Fans – 3 Day Period



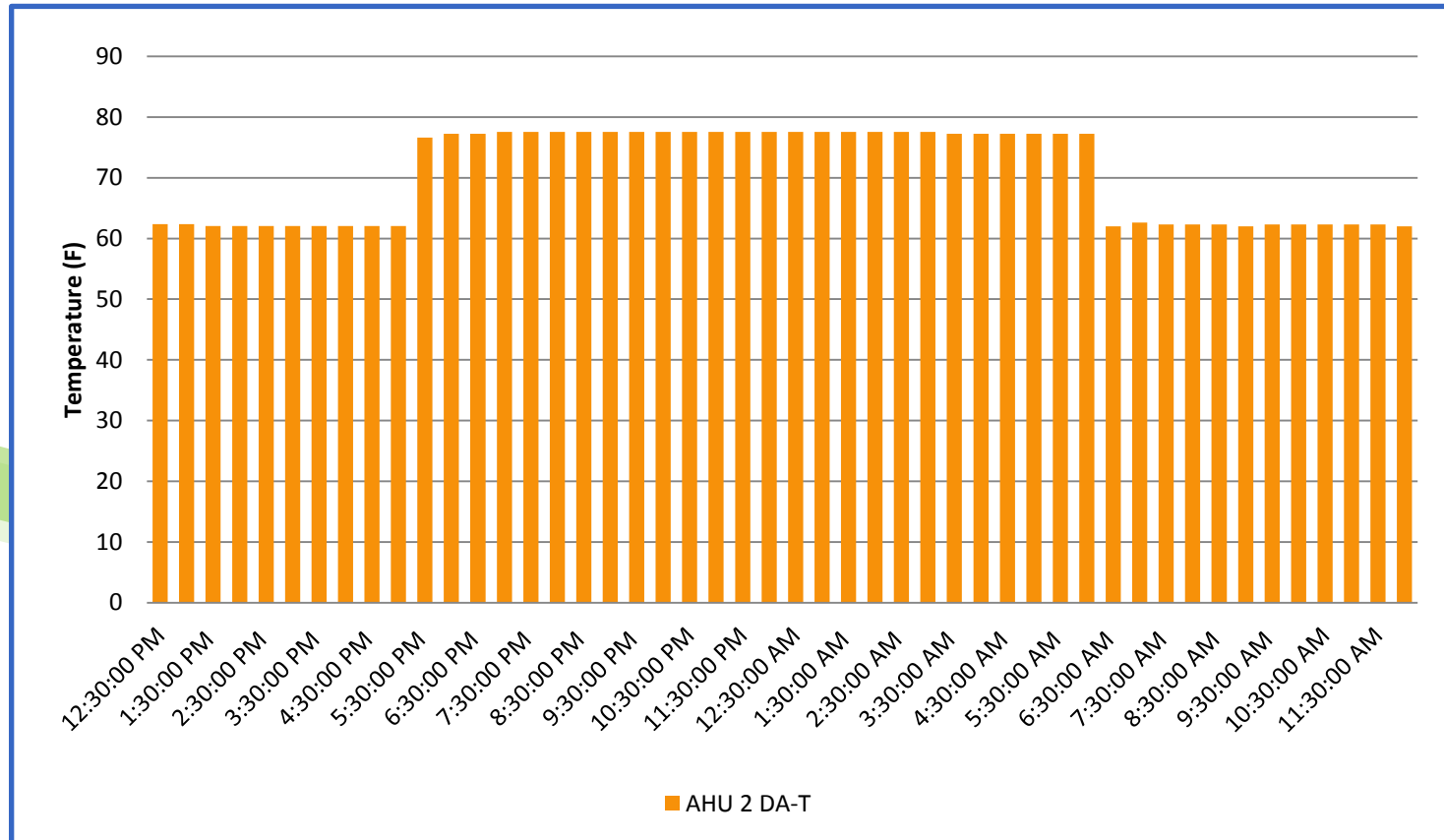


# Metasys Controls Upgrades

- DDC was implemented on the following equipment:
  - Air Handling Unit 1 (AHU-1)
  - AHU-2
  - Council Chamber Roof Top Unit (RTU)
  - Chiller Plant
  - Boiler Plant
  - Exhaust Fans (EF) 1, 2, and 4
  
- The Energy Savings due to this ECM are a result of night setback (NSB) and EF shutdown. NSB instructs the AHU and RTU to maintain a lower building temperature when the building is vacant versus what is desired when occupied. EFs will now cease operation when the building is unoccupied.



# Metasys Controls Upgrades AHU 2 – 1 Day Period



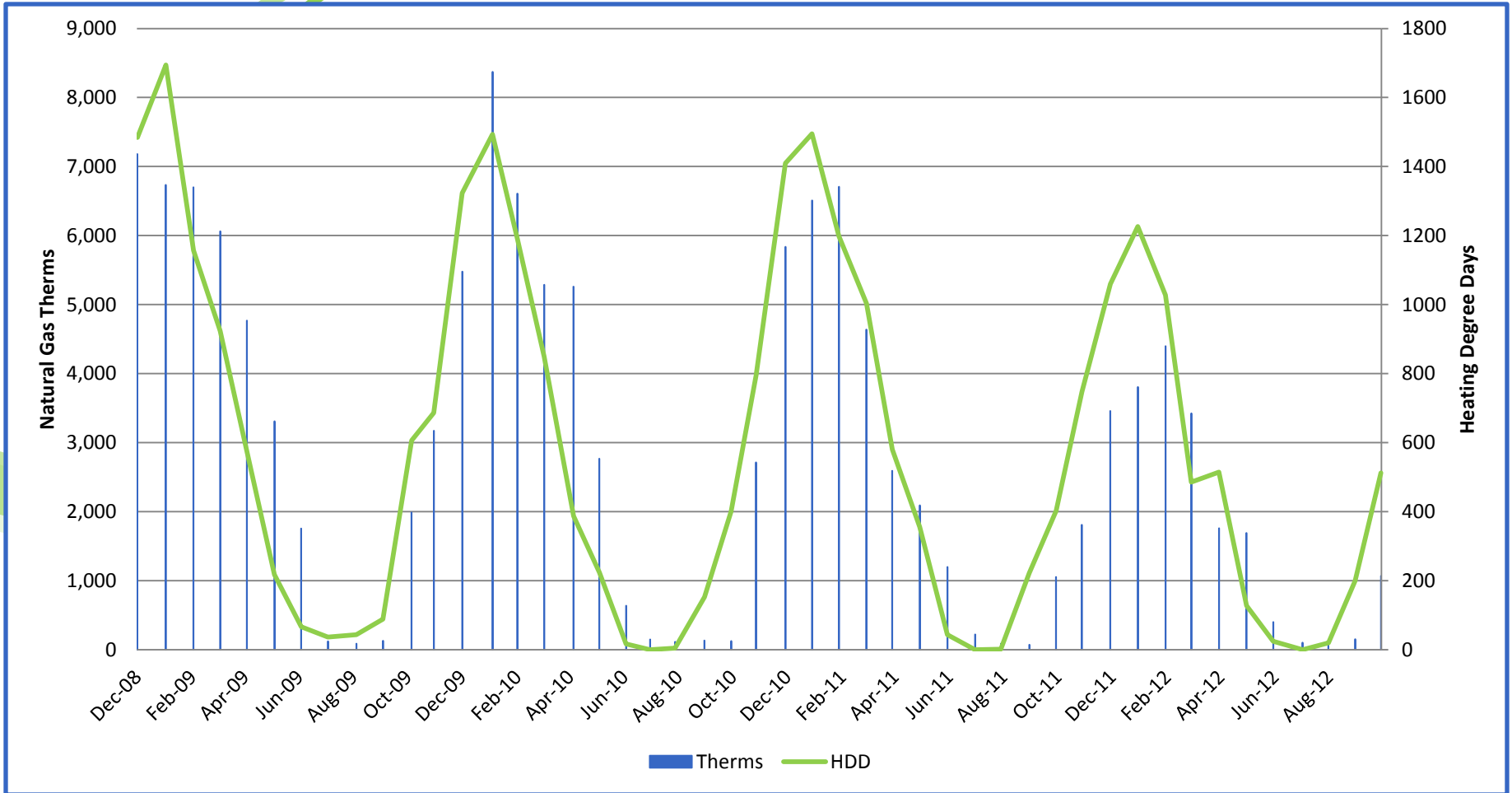
# Natural Gas Savings Profile



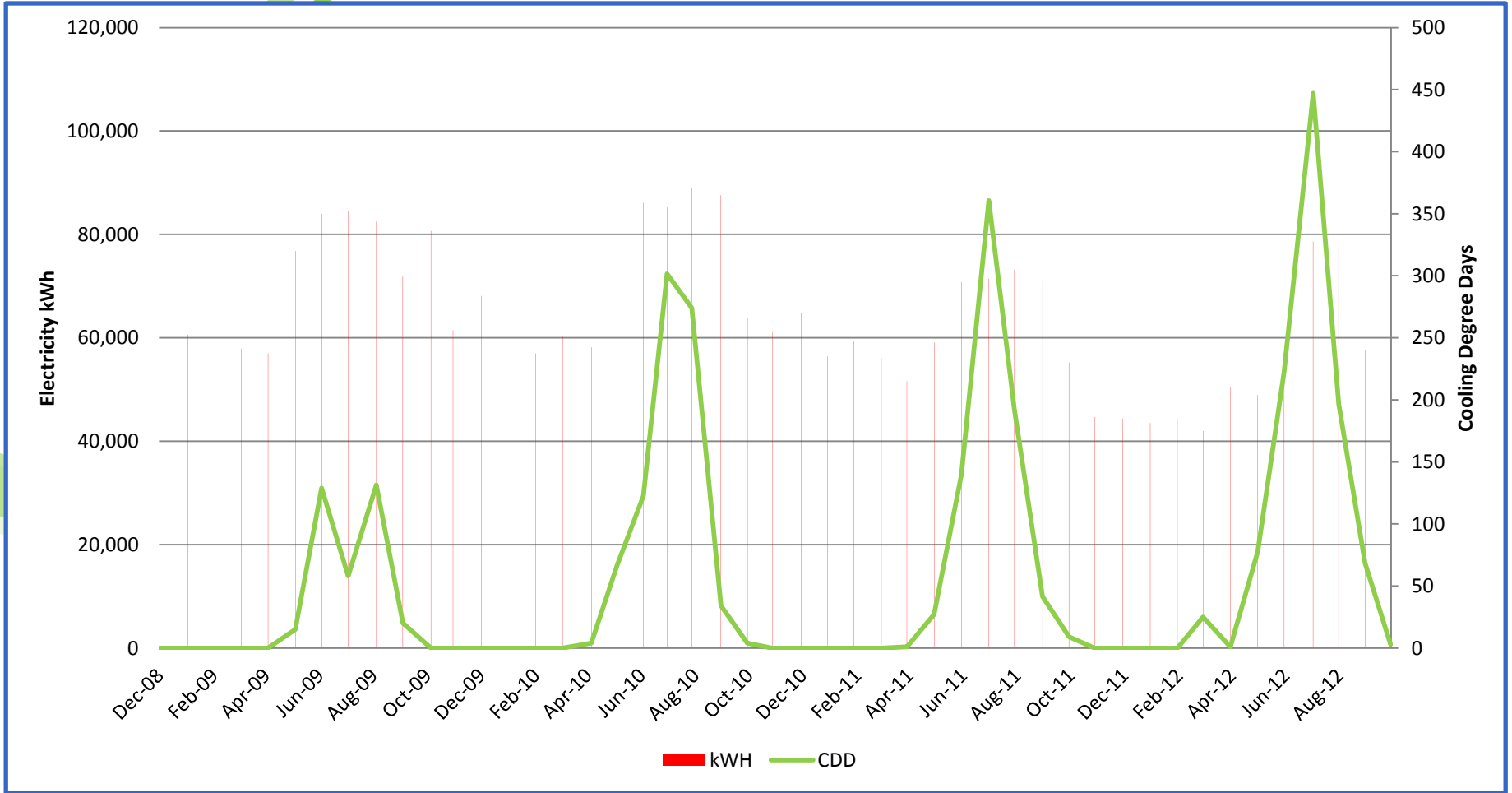
# Electric Savings Profile



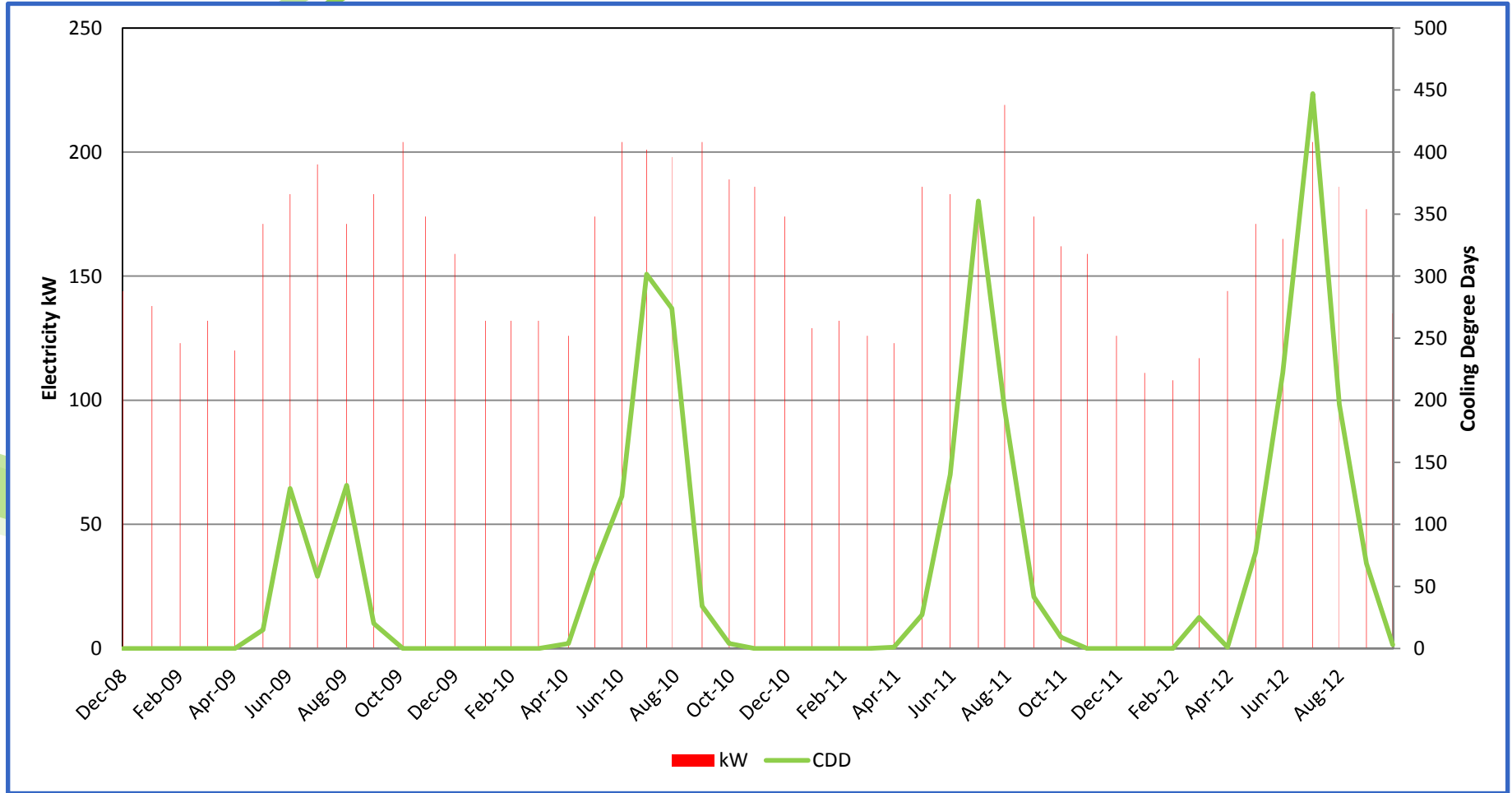
# Natural Gas Usage versus Weather



# Electric Consumption versus Weather



# Electric Peak Demand versus Weather



# Financial Summary

## First Year Savings

Year 1 Natural Gas Savings – 8,578 Therms	\$6,296
Year 1 Electricity Savings – 222,069 kWh	\$19,202
<b>Total Year 1 Savings</b>	<b>\$25,498</b>
Year 1 Savings Guarantee	\$20,662
<b>Year 1 Excess Savings</b>	<b>\$4,836</b>



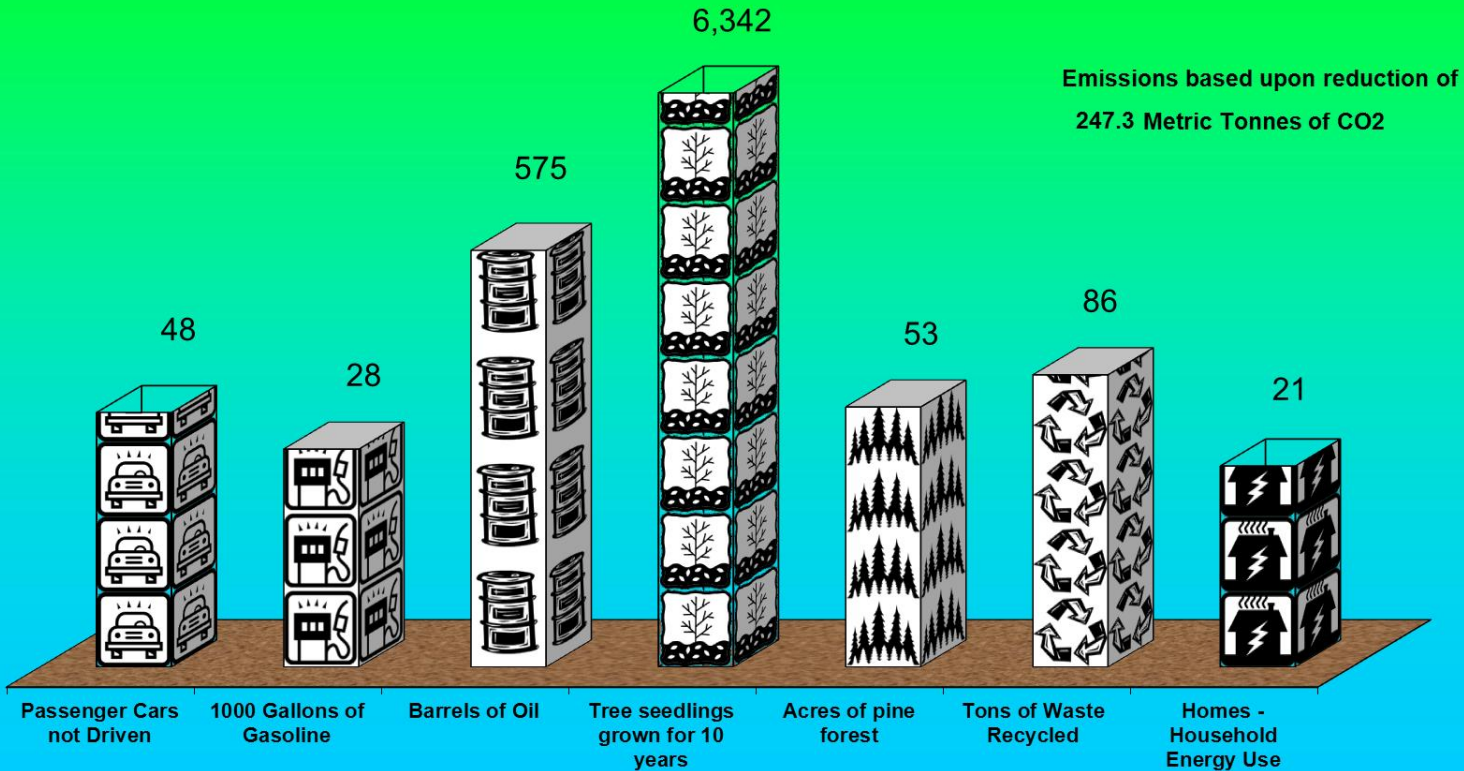
# Financial Summary

## Savings to Date

Year 1 Natural Gas Savings – 8,578 Therms	\$6,296
Year 1 Electricity Savings – 222,069 kWh	\$19,202
<b>Total Year 1 Savings</b>	<b>\$25,498</b>
Construction Period Savings	\$3,106
<b>Total Savings to Date</b>	<b>\$28,604</b>
Savings Guarantee to Date	\$20,662
<b>Excess Savings</b>	<b>\$7,942</b>

# Greenhouse Gas Savings Year 1

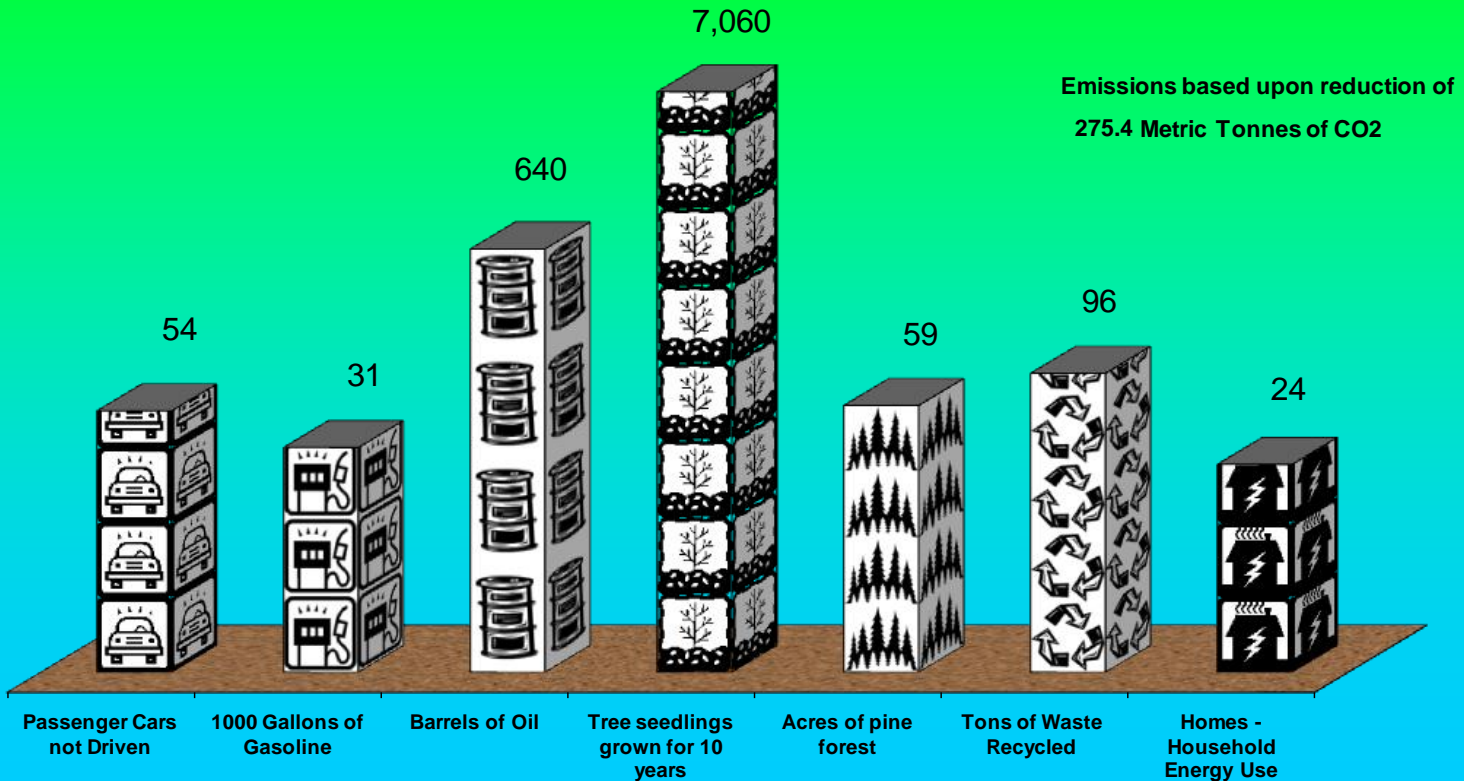
## City of Janesville Emission Reduction Equivalence



Information is based on [www.epa.gov/cleanenergy/energy-resources/calculator.html](http://www.epa.gov/cleanenergy/energy-resources/calculator.html)

# Greenhouse Gas Savings to Date

## City of Janesville Emission Reduction Equivalence



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# Benefits

- **Improved Lighting Quality** – The new high efficiency lighting has greatly increase the quality of its immediate environment at a lower cost per lumen.
- **Lower Maintenance Costs** – Increase in lighting burn hours leads to reduction in frequency of lamp changes. Additionally, slower motor speeds and less frequent equipment operation leads to lower stress on the mechanical system components.
- **Lower Environmental Footprint** – Energy savings due to higher efficiency equipment and reduction in motor speed based on demand results in lower greenhouse gas emissions.



# Summary

- The Year 2 Annual Report will be delivered within 60 days of the M&V End Period of October 31, 2013.
- Please know that Johnson Controls, Inc. values its relationship with City Janesville. We welcome the opportunity to continue to be of service in helping you meet your goals throughout your city.
- Feel free to contact us with any questions and/or if further information is needed.